Dispensing device for drinks

DESCRIPTION

The invention relates to a dispensing device for drinks or similar dosable liquid foodstuffs, in particular for coffee, milk, soft drinks or soups.

Such dispensing devices, usually called "drinks vending machines", have become customary not only in self-service restaurants or canteens, but are also used quite generally in gastronomy in order to reduce the number of service personnel. In order to dispense a large number of different drinks – espresso, cappuccino, latte macchiato and ordinary filter coffee are only some examples – a single dispensing device is used, with a filling mechanism capable of filling a container with drinks from various sources. Especially for supplying, e.g., cappuccino at an espresso machine, some work must be done by hand in order to achieve optimal formation and especially retention of foam. In the case of latte macchiato it is even necessary to provide a layering of the various "ingredients" so that coffee is at the bottom of the container, milk above that, and foam is on top of the milk. This is practically impossible with the conventional dispensing devices.

The objective of the invention is to disclose a dispensing device of the kind cited above that enables optimal filling of the containers.

This objective is achieved by a dispensing device for drinks or similar dosable liquid foodstuffs, in particular for coffee, milk, soft drinks or soups, that comprises an identification means to detect a vertical height of a container for receiving the foodstuff and to send out a height signal, a filling mechanism so disposed that its height relative to the container can be adjusted, and a control means that in response to the height signal adjusts the filling mechanism to an adjustable filling height with respect to the container before the container is filled with the foodstuff.

It is an essential point of the invention that by means of a single filling mechanism, without additional work by hand, the various drinks can be put into the containers appropriate for each of them in such a way that a "falling height" can be set to be optimal for the drink in question. The result is not only to prevent soiling of the dispensing device by spray from the drink during filling; in addition, it can be ensured that because of the "gentle" filling a desired layering (foam on the cappuccino, the layers previously described in the case of latte macchiato) is achieved.

Preferably the control means is so constructed that after a filling process has been concluded, the filling mechanism is adjusted to a waiting position in which its height above the container is maximal. This height adjustment to a resting position after the filling process "signals" to the user that the filling process has now been completed. The next container can now be placed under the filling mechanism, regardless of the container's height.

Preferably the control means is so designed that various filling heights can be stored in memory. On one hand this enables the filling mechanism to be brought into an optimal position with respect to the container, while on the other hand a given container can thus be filled with various amounts of liquid, for which purpose various filling heights can be

prespecified. In this case preferably the various filling heights are stored in association with various foodstuffs, so that in a glass a larger filling height is permitted for latte macchiato, with foam on top, than for a coffee with milk (but no foam).

The identification means preferably comprises a filling-state sensor, by way of which to set a maximal filling state for the container, i.e. the amount of the foodstuff with which the container can be filled. In this way it can be ensured that an intentionally wrong operation to obtain multiple filling does not cause the container to overflow.

The identification means preferably comprises a programmable memory in which the height signals corresponding to various identification signals can be stored. In this way items of information about the container that do not primarily have anything to do with its height can be used to find the optimal height adjustment. For example, the container can be weighed and stored values can then be used to determine from this weight the height adjustment that should be made. It is also possible to provide the container with identifying labels such as magnetic strips, so that from this information the height of the container can be directly or indirectly derived.

In one embodiment of the invention the identification means comprises sensors for (directly) detecting the height of the container, and in particular these sensors can be constructed as a light barrier. Thus in this case a direct height measurement is made.

Alternatively or in addition the identification means comprises reading means to read information attached to the container, for example the above-mentioned magnetic strips or a barcode. Such arrangements can be very easily produced.

Preferably a learning means is provided that comprises a manually operated adjustment device to adjust the filling mechanism and to store a height signal in association with a specific container. The manufacturer (or the manager of the site) can thus, in a learning process, conduct trials to find an optimal filling height for the containers he has available and store the results in such a way that the filling mechanism, when a customer places a container of the same kind under it, is automatically adjusted to the prespecified (learned) height.

Preferably the filling mechanism comprises a container receptacle that is fixed in position and an adjustable dispensing region, so that the container can always be set down at the same height. The dispensing region is preferably connected to foodstuff-supply apparatus, such as storage vessels or the coffee-filter outflow etc., in such a way that a distance over which the foodstuff passes on the way from the supply means to an outlet into the open air is independent of the height of the filling mechanism. As a result, a uniform quality of the product can be ensured even for different filling heights.

In the following the invention is explained with reference to an exemplary embodiment. The attached drawing shows schematically a dispensing device with the associated sensors and the identification means, in a block diagram.

As shown in the drawing, a container 1, in the present case a cup, is set onto a container receptacle 21 of a filling mechanism 20. Above the cup 1 is an outlet 23, which comprises a first pipeline 24 and a second pipeline 25 that are united shortly ahead of the opening of the outlet 23. The outlet 23 is situated within a dispensing region 22 of the filling mechanism 20, which by way of a rack-and-pinion drive mechanism 33 with an adjustment gear 34 can be moved upward and downward (see double-headed arrow), so as to be lowered toward the container 1 or raised away from it. The first pipeline 24 and second

pipeline 25, and hence the outlet 23, are connected by way of valves 28, 29 (and where appropriate, additional valves) as well as a first conduit 30 and a second conduit 31 (and where appropriate, additional conduits) to a first supply means 26 and a second supply means 27 (and where appropriate, additional supply means, as indicated in the drawing). The valves 28, 29 are controlled by a control means 9, which receives its command signals from an identification means 10. To the identification means 10 are sent the output signals of the following sensors: a height sensor 14 for measuring the height of the upper rim of the container above the surface of the receptacle 21; a first, immovably mounted filling-state sensor 15; a second filling-state sensor 16, which is fixed to the dispensing region 22; a weighing means 17 to measure the weight of the container 1; and a reading means 18 to read whatever information has been applied to the container 1. From the data the identification means 10 receives from the sensors 14 to 18, the height of the container and the level of the liquid in the container can be derived. Other data that can be used for this purpose are stored in a memory 11 of the identification means 10, in particular data concerning the physical dimensions (in particular the height and the nature of the container). From these data the identification means derives signals by means of which the control means 9 operates the adjustment drive 34 in such a way that the dispensing region 22 of the filling mechanism 20 is shifted toward the container 1 far enough that the opening of the outlet 23 is at a relatively slight vertical distance from the upper rim of the container, or in some cases is even within within the container 1, before the valves 28 and 29 are opened to dispense the foodstuff. This enables the container 1 to be filled in an optimal way, with no spray or splashes. In principle, of course, it is also possible to move the container receptacle 21 up and down rather than the dispensing region 22, in order to adjust their relative heights.

The control means 9 is so designed that after completion of a filling process, i.e. when a prespecified amount of liquid has been dispensed, the dispensing region 22 is moved upward by the adjustment drive 34 to its highest position, so that the customer can easily discern that the dispensing is finished and another container, e.g. with a considerably greater height, can be placed on the container receptacle 21 to be filled.

It is now possible to undertake the described control procedures and lowering of the dispensing region 22 toward the container 1 on the basis of continuous measurements, in particular by the height sensor 14. In this process a retraction (raising) of the dispensing region 22 relative to the liquid level can also be done simultaneously, on the basis of the second filling-state sensor 16. However, for this control procedure a greater degree of reliability can be achieved by "identifying" the container 1 so that its height, which has previously been measured precisely, is read out from the memory 11 and the height adjustment of the dispensing region 22 is selected accordingly. This prior measurement can be accomplished particularly simply by a learning means 12 with a keyboard 13, which is designed so that in a first setting procedure a particular kind of container 1, e.g. an espresso cup, is set onto the receptacle 21 and the dispensing region 22 is lowered to the desired height under manual control, by way of the keyboard 13. Then the output signals from the various sensors are used to identify the container, by way of the learning means 12, and are stored in the memory 11 along with the manually adjusted height. When another container 1 of the same kind is put onto the receptacle 21 by a customer, the identification means 10 can identify the container by comparison with the stored data and move the dispensing region 22 to the required position by way of the control means 9.

From the above it can be seen that the invention relates not only to a dispensing device, but also to a method for operating a dispensing device.

List of reference numerals

1	Container
9	Control means
10	Identification means
11	Memory
12	Learning means
13	Keyboard
14	Height sensor
15	1st filling-state sensor
16	2nd filling-state sensor
17	Weighing means
18	Reading means
20	Filling mechanism
21	Container receptacle
22	Dispensing region
23	Outlet
24	1st pipeline
25	2nd pipeline
26	1st supply means
17	2nd supply means
28	1st valve
29	2nd valve
30	1st conduit
31	2nd conduit
33	Rack-and-pinion gear
34	Adjustment drive